

The genus *Radfordia* in the Ethiopian Region, with descriptions of two new species (Acarina: Trombidiformes, Myobiidae)

by

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In *The Arthropod Parasites of Vertebrates in Africa South of the Sahara (Ethiopian Region)* edited by F. Zumpt (1961), Dr. R. F. Lawrence compiled the trombidiform mites and listed in the genus *Radfordia* Ewing (syn: *Austromyobia* Lawrence and *Cryptomyobia* Radford) the following species: *R. affinis* (Poppe), *R. davisi* (Radford), *R. ensifera* (Poppe), *R. forcipifer* Lawrence and *R. rotundata* (Lawrence).

Radfordia davisi was based on a single nymphal specimen, found on the Norwegian Rat (*Rattus norvegicus* (Berkenhout)), at Freetown, Sierra Leone. We have not seen the holotype or any specimens which could be referred to it, and it is also not comparable with the other specimens listed above, which are based on the adult stage.

Specimens of the other four species are before us, as well as two new species, namely *R. elegantula* from the Pygmy Mouse (*Mus minutoides* A. Smith) and *R. praomys* from the Multimammate Rat (*Praomys natalensis* (A. Smith)). All these will be discussed in alphabetic order:

1. — *Radfordia affinis* (Poppe)

Myobia affinis Poppe, *Zool. Anz.* **19**, 1896: 509, figs. 7–9; Radford, N. W. *Naturalist* 1935: 248, figs. 1–3. *Radfordia affinis*, Ewing, *Proc. ent. Soc. Wash.* **40**, 1938: 190; Radford, *Bull. Mus. Paris* (2) **21**, 1949: 694, figs. 43–46; Smith, *Ann. ent. Soc. Amer.* **48**, 1955: 196, figs.

A typical parasite of the House Mouse (*Mus musculus* Linnaeus) and commonly found in the Holarctic region. From the Ethiopian region, so far only a few specimens (♂♂ and ♀♀) are known, which were collected in 1958 and 1959 on the White Mouse in laboratories of the South African Institute for Medical Research, Johannesburg.

In the female sex, *R. affinis* is easily separable from all other *Radfordia* species recorded so far from the Ethiopian region by the slender dorsal setae (fig. 1).

2. — *Radfordia elegantula* n. sp.

A slender species, characterized in the female sex by broadened submedian setae IV and V on the dorsal side, and by a pair of long ventral setae behind the fourth pair of legs. The caudal setae are as long as the body (fig. 2).

Besides the broad submedian setae IV and V, the dorsal side shows 6 pairs of long

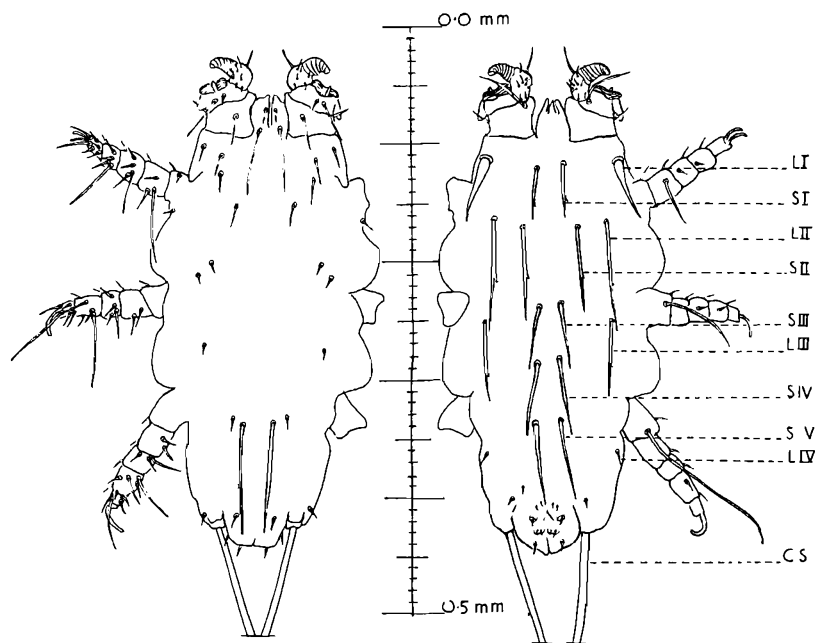


Fig. 1. *Radfordia affinis* (Poppe)
 Female in ventral (left) and dorsal view (right.)
 s I—s V = submedian setae I to V.
 l I—l IV = lateral setae I to IV.
 cs = caudal setae.
 (Specimen from White Mouse, Johannesburg.)

and slender, mostly barbed setae, and in the posterior part a number of short and tiny setae. Capitulum with 2 pairs of ventral setae. The first pair of legs is composed of 3 segments, the last being modified to form a claw. Outer margin of the second segment with a transparent lamella which is shaped like an axe-blade. Tarsus of leg II with 2 claws of moderate thickness and of equal length. Tarsus of leg III with a single claw which is curved and much longer than that of leg II, whereas leg IV is provided with a single claw still longer than that of leg III. Second segment of leg II and the first of legs III and IV each with a long dorsal seta.

Body-length: 0,4 mm.

Locality and host: SOUTH AFRICA, Zeerust, Transvaal, 15. VII. 1967, 2 ♀♀ (holo- and paratype) from *Mus minutoides* A. Smith. The specimens have been collected by the State Veterinarian Dr. I. Zumpt, Mafeking. Types in the collection of the S.A.I.M.R., Johannesburg.

3.—*Radfordia ensifera* (Poppe)

Myobia ensifera Poppe, Zool. Anz. 19, 1896: 341, figs. 12–14; Radford, N.W. *Naturalist* 1934: 358, figs. 7–9
Radfordia ensifera Ewing, Proc. ent. Soc. Wash. 40, 1938: 188.
Myobia ratti Skidmore, Canad. Ent. 66, 1934: 112.

The type-host of *R. ensifera* is the Norwegian Rat (*Rattus norvegicus* (Berkenhout)), type-locality Bröcken near Vegesack, Germany. Lawrence identified specimens from the

House Rat (*Rattus rattus* Linnaeus) in Pietermaritzburg, Natal, and from the White Rat in Johannesburg, Transvaal, as belonging to this species.

There are 3 ♀♀ and 1 ♂ from *Rattus rattus* ex Coll. Lawrence before us, which, basing them on Poppe's description, can be referred to *R. ensifera*. Those specimens, however, found on the White Rat in Johannesburg, represent a new species, the true host of which is *Praomys natalensis* (A. Smith), from which we were able to recover a fair number of specimens. The few formerly found on the White Rat are due to contamination. In the laboratories of the South African Institute for Medical Research, both kinds of rats are kept in the same rooms for experimental purposes.

The female of *R. ensifera* is characterized by broad submedian dorsal setae III to V, submedian setae I and II are slender, the latter being rather long. Lateral seta I is very broad. For further details see fig. 3.

4.—*Radfordia forcipifer* Lawrence

Radfordia forcipifer Lawrence, *J. ent. Soc. S. Afr.* 17, 1954: 43 figs. 2–5.

Austromyobia schoutedeni Lawrence, *Ann. Mus. Congo Tervuren, Zool.* 1, 1954: 214. figs. 1–2.

So far, only the type series is known, consisting of 2 ♀♀ and 2 ♂♂ collected at Kosi Bay, Zululand, from the Highveld Gerbil (*Tatera brantsii* (A. Smith)). *Austromyobia schoutedeni* from the same locality and host represents the nymphal stage.

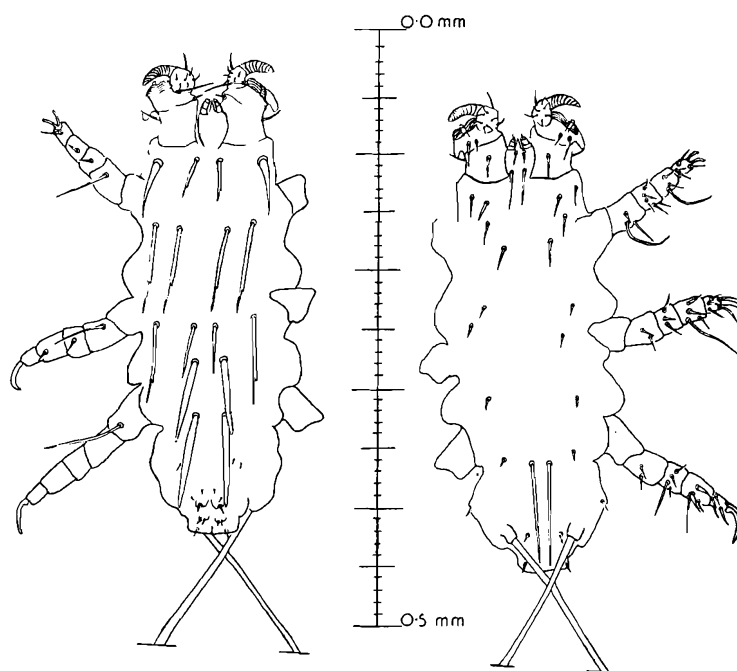


Fig. 2. *Radfordia elegantula* n. sp.
Female in dorsal (left) and ventral view (right).
(Holotype from *Mus minutoides*, Zeerust.)

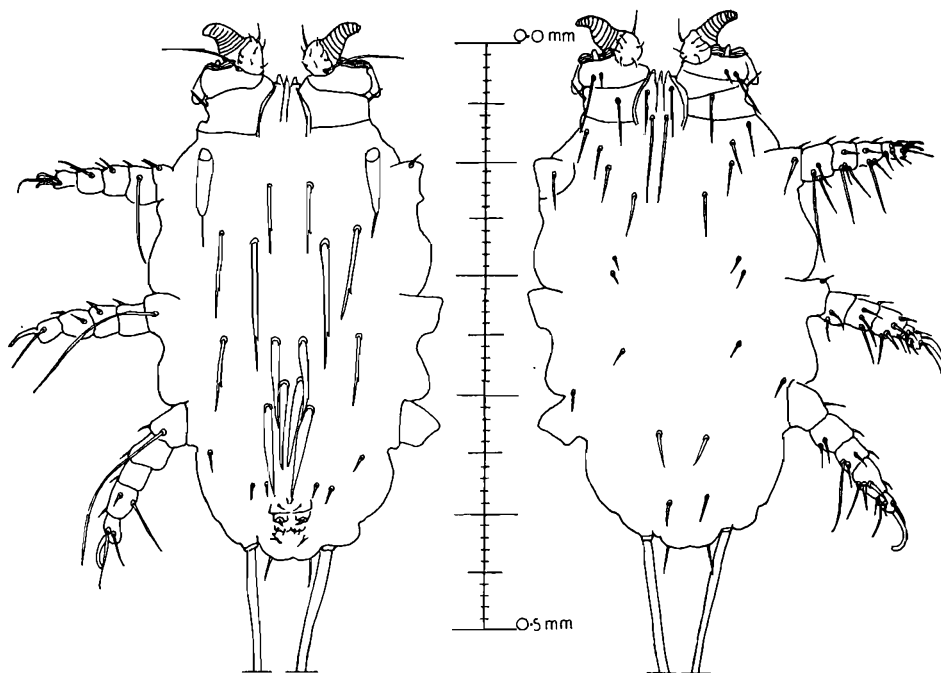


Fig. 3. *Radfordia ensifera* (Poppe)
Female in dorsal (left) and ventral view (right).
(Specimen from *Rattus rattus*, Pietermaritzburg.)

This species is well characterized by the tiny pair of submedian dorsal setae I. All other submedian and lateral setae are broad (fig. 4).

5.—*Radfordia praomys* n. sp.

R. praomys is similar to *R. elegantula*, but the ventral side of the female shows only short setae. Furthermore, the body of *R. praomys* is distinctly broader than in *R. elegantula* (fig. 5).

Apart from these two features which allow an easy separation of the two species, the chaetotaxy is very similar, and minor differences may be detected by a comparison of figs. 2 and 5.

The male of *R. praomys* was also found and is shown in fig. 6.

Body-length: 0,4 mm.

Locality and host: SOUTH AFRICA, Johannesburg, Transvaal, 4. II. 1969, 15 ♀♀ (holo- and paratypes) and 11 ♂♂ (paratypes) from *Praomys natalensis* (A. Smith). The rat, from which the specimens were recovered, was kept in captivity for experimental purposes in the South African Institute for Medical Research, Johannesburg. Two further females from a White Rat in the same laboratory are to be regarded as contaminations from the true host.

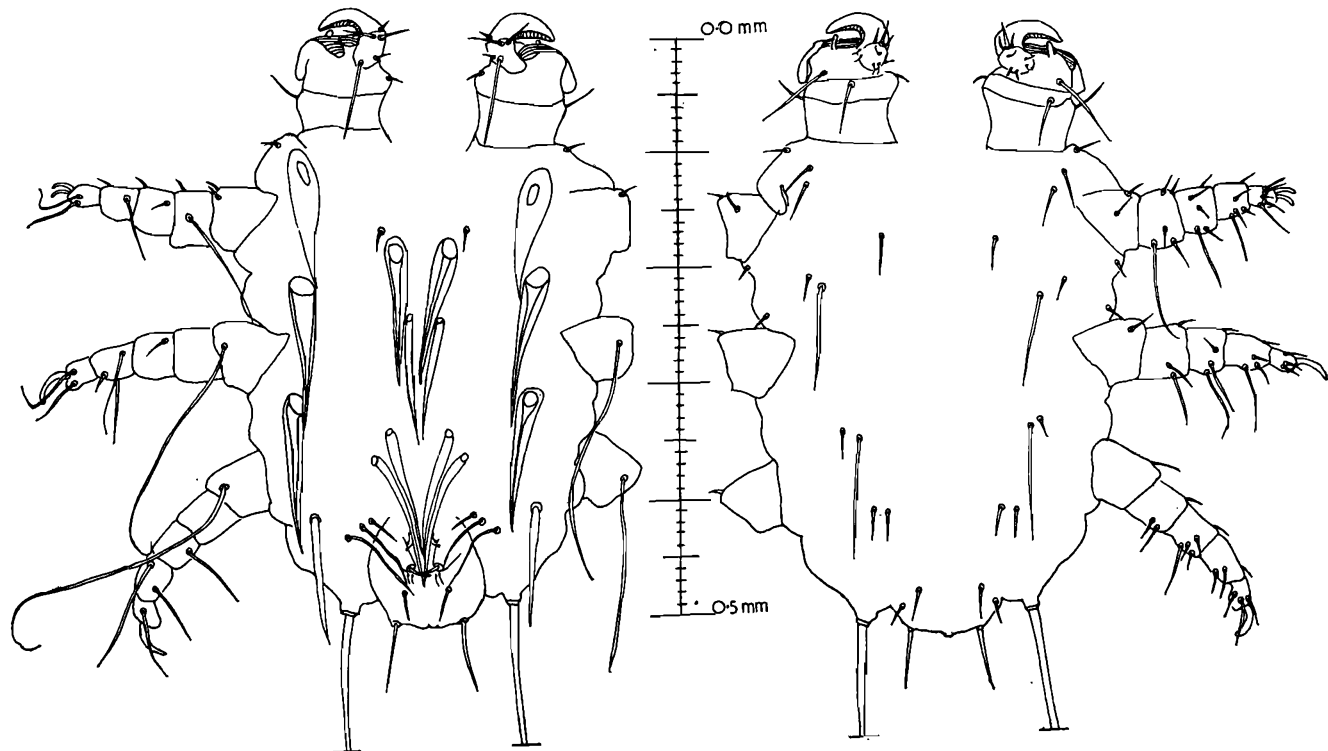


Fig. 4. *Radfordia forcipifer* Lawrence
Female in dorsal (left) and ventral view (right).
(Holotype from *Tatera brantsii*, Kosi Bay, Zululand.)

Holo- and paratypes are preserved in the collection of the S.A.I.M.R., Johannesburg. One paratypic pair each has been presented to the British Museum (Nat. History), London, and the Natal Museum, Pietermaritzburg.

6.—*Radfordia rotundata* (Lawrence)

Myobia rotundata Lawrence, *Ann. Natal Mus.* 12, 1951: 105 figs. 11–13.

Cryptomyobia rotundata, Radford, *Ann. Mus. Congo Tervuren, Zool.* 1, 1954: 242.

Lawrence described this species under *Myobia* and stated expressly that in the female the second pair of legs has only one claw. In Zumpt's book (1961), however, he had placed this species, without any comment, to the genus *Radfordia*, which is characterized by two claws on legs II in the adult stages. In his description of the male, Lawrence says that the second leg shows two claws. The type series (N.M. 4927) is said to consist of 6 ♀♀, and 2 ♂♂ and 3 nymphs.

From the Natal Museum, we received two slides with this number and with one labelled 'types ♂ and ♀' and the other 'type ♀'. The examination of these slides resulted in the findings that the first slide contained 1 ♂ and 7 nymphs and the other one nymph. Comparing his description, it becomes clear that the diagnosis of the female actually refers to a nymphal stage. The male is correctly identified.

A further slide with the number N.M. 5781 is also labelled 'types ♂, ♀'. The specimens, however, were collected on March 1951, whereas the true type series is labelled 'Dec., 1950' and also mentioned under this date in the original description. These specimens can therefore not be 'types'. They represent one male and one nymph.

Four more slides carry the collection number N.M. 5822 and contain, correctly identified, one larva and 3 nymphs. They were collected in December, 1954.

Finally 2 more slides with the number N.M. 5793 contain, this time correctly diagnosed, one male and one female, collected in October 1954.

All these specimens were found on the Lesser Grey Mole Rat (*Cryptomys hottentotus* (Lesson)), at Pietermaritzburg, Natal.*

From these findings, it becomes clear that Lawrence, when describing *Myobia rotundata*, was dealing with a nymphal stage, but thought he had a female before him. Later, however, he recognized this error, correctly labelled the female as such and placed it in Zumpt's book in the genus *Radfordia*. But evidently he never published a correction.

Radford (1954), creating the genus *Cryptomyobia* for *Myobia rotundata* Lawrence, based the description on Lawrence's paper, without having seen any specimens. It is therefore a synonym of *Radfordia* Ewing, as already proposed by Lawrence (Zumpt, 1961).

The female of *R. rotundata*, until now undescribed, is characterized by a combination of truncate and simple setae on the ventral side (fig. 7). The dorsal side shows broad and flattened submedian and lateral setae tapering to a sharp point and barbed. The first pair of legs is composed of 3 segments, the last being modified to form a claw. Leg II dorsally with a long seta each on the second and fourth segment, tarsus with 2 short claws of equal length. Leg III with a very long dorsal seta on segment one, and a shorter one on the fourth segment, tarsal claw single. Leg IV with two long dorsal setae as on leg III, tarsal claw

* According to De Graaff (1968, *Smithsonian Institution Preliminary Identification Manual for African Mammals* no. 16) *Cryptomys hottentotus* does not occur in Natal, and the species called *C. hottentotus* above is most likely *C. natalensis* (Roberts, 1913).

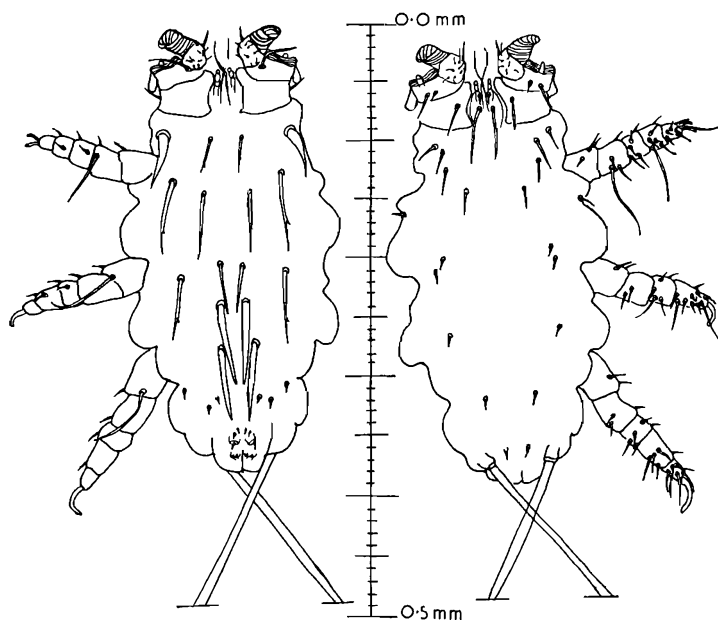


Fig. 5. *Radfordia praomys* n. sp.
Female in dorsal (left) and ventral view (right).
(Paratype from *Praomys natalensis*, Johannesburg.)

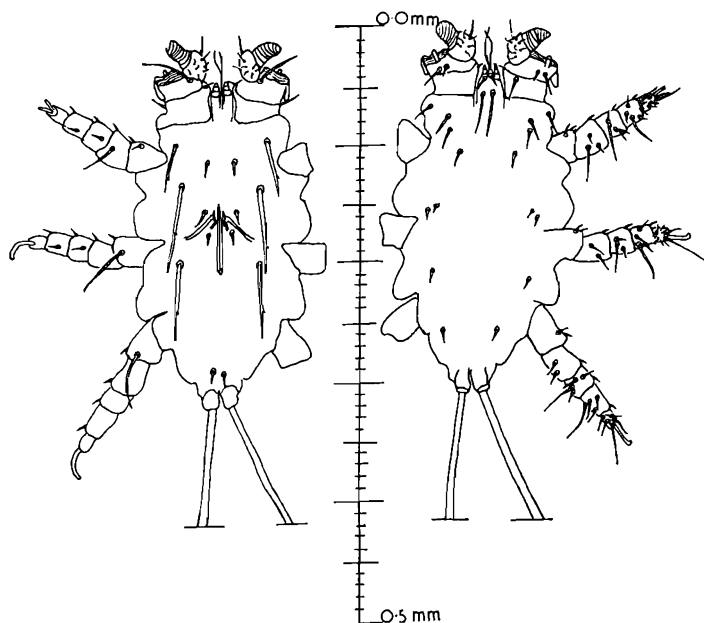


Fig. 6. *Radfordia praomys* n. sp.
Male in dorsal (left) and ventral view (right).
(Paratype from *Praomys natalensis*, Johannesburg.)

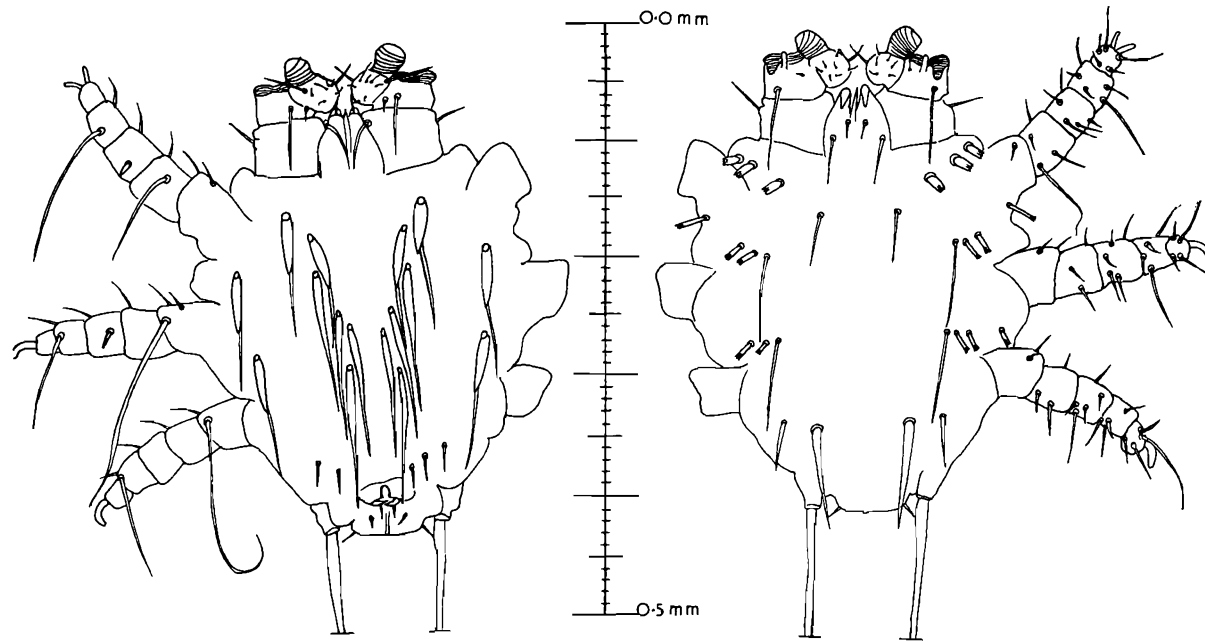


Fig. 7. *Radfordia rotundata* (Lawrence)
Female in dorsal (left) and ventral view (right).
(Specimen from *Cryptomys hottentotus*, Pietermaritzburg.)

single too. All legs with strong spiniform setae. The capitulum bears ventrally 2 curved processes and 2 pairs of setae.

Body-length: 0,4 mm.

Locality and host: The description is based on one specimen, collected by Dr. R. F. Lawrence from *Cryptomys hottentotus* (Lesson), at Pietermaritzburg, October 1954.

Key to the Radfordia species in the Ethiopian region (females only)

1. (2) No dorsal setae broad and flattened (fig. 1). On *Mus musculus* and its albino variety 1.—**affinis** (Poppe)
2. (1) At least some of the dorsal setae broad and flattened 3
3. (4) Dorsal submedian seta I tiny and situated close to the base of submedian seta II (fig. 4). On *Tatera brantsii* 4.—**forcipifer** (Lawrence)
4. (3) Dorsal submedian seta I of normal size or very broad 5
5. (6) All submedian and lateral setae broad and flattened (fig. 7). On *Cryptomys hottentotus* 6.—**rotundata** (Lawrence)
6. (5) Only some of the submedian and lateral setae broad and flattened 7
7. (8) Submedian setae III to V broad and flattened (fig. 3). On *Rattus norvegicus* and *Rattus rattus* 3.—**ensifera** (Poppe)
8. (7) Only submedian setae IV and V broad and flattened 9
9. (10) Body slender. Ventral side with one pair of long setae in the posterior part (fig. 2). On *Mus minutoides*. 2.—**elegantula** n. sp.
10. (9) Body stout. Ventral side without a long pair of setae (fig. 5). On *Praomys natalensis* 5.—**praomys** n. sp.

ACKNOWLEDGEMENTS

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REFERENCES

- RADFORD, C. D. (1954). Observations on the fur mites (Acarina Myobiidae). *Ann. Mus. Congo Tervuren, Zool.*, 1: pp. 238–248.
- ZUMPT, F. (ed., 1961). The arthropod parasites of vertebrates in Africa south of the Sahara (Ethiopian region). Vol. I (Chelicerata). *Publ. S. Afr. Inst. Med. Research* 9 no. 1: 457 pp.

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